

6.0 Itemized Estimate of Probable Costs

6.1 Recommended Alternative

The estimate of probable construction cost for the recommended mainline alternative is \$ 457,096,000, which includes the cost for the recommended alternative for the Table Mesa TI, \$7,978,000. The detailed estimate of probable cost is shown on the following pages. The estimated costs are based upon unit prices from ADOT's Construction Cost Data Base. Pavement structural sections used for the cost estimate include a rigid pavement section from SR 101L to the Carefree Highway TI and flexible pavement from the Carefree Highway TI to the northern project limit. The maximum pavement section for the study area is estimated at 19 inches for flexible pavement (9 inches of asphaltic concrete over 10 inches of aggregate base) and 18 inches for rigid pavement (14 inches of doweled Portland cement pavement over 4 inches of aggregate base). ARFC is included in the pavement section: 1" ARFC on PCCP and ½" ARFC on AC pavement. For estimating purposes, all existing asphalt pavement was assumed to be removed and replaced, although portions of the existing pavement could possibly remain in place if determined to be in satisfactory condition at the time of final design.

Frontage roads from Pinnacle Peak to Happy Valley Road and from Dixileta Drive to Carefree Highway will be designed and constructed by the City of Phoenix. Construction and right-of-way costs for these frontage roads are not included in the estimate. Costs for right-of-way acquisition and construction of the City of Phoenix planned interchanges at Jomax Road, Dixileta Drive, Lone Mountain Road and Dove Valley Road are also excluded from the estimate.

The following assumptions were also used for the cost estimate:

- The ADOT Right-of-Way Group prepared a preliminary cost estimate for RW acquisition. The estimate considered costs for property acquisition, relocations, demolition, miscellaneous costs, and the conversion of two-way frontage roads to one way. The costs for bridging the 24-36' concrete channel on the east side of I-17 between Scatter Wash and Skunk Creek were also estimated. These right-of-way costs are included in the estimate.
- The ADOT Right-of-Way Group identified nine billboards that will need to be either moved or purchased as part of the project. Because permits and available space will be required for the signs to be moved and neither of those can be assured, the cost of the billboards is not included in the estimate.
- New landscaping was included south of the New River TI. Cost for restoration of disturbed areas was included where existing landscaping is present.
- The northern limit for ramp metering systems and FMS was assumed to be the New River TI.
- Noise barrier unit costs include standard surface treatment/rustication and do not include potential aesthetic treatments.
- Construction of the full I-17 typical section will require reconstruction of the interchanges at Pinnacle Peak Road and Happy Valley Road. Reconstruction of these interchanges is included in the estimate at \$6,000,000 each.
- Construction of the full I-17 typical section will require widening of the interchange bridges at Black Canyon City (Coldwater Canyon Road). Because these bridges have been identified as structurally obsolete, reconstruction of the interchange is included in the estimate at \$6,000,000.
- Several potential utility conflicts have been identified as outlined in Section 5.12. A cost per mile was assumed for all utilities that will need to be relocated due to the roadway widening

and associated right-of-way acquisition. The same cost was applied regardless of the type of utility and the complexity of the relocation.

- As noted in Chapter 5, detailed mapping was not available during the development of the study; therefore, cost items associated with earthwork, such as Roadway Excavation, Borrow, and Rock Excavation may vary significantly from those calculated in final design, when more detailed information is available.

The following assumptions were made for the cost derivation for drainage improvements:

- The costs for a "regional" detention basin west of I-17 at Scatter Wash are included in the estimate.
- The costs for a combined closed drainage system through the USAA property on the east side of I-17 between Happy Valley and Jomax Roads are not included in the estimate.
- All culverts are extended to the appropriate clear zone requirements or width of roadway widening, whichever distance is greater.
- Reinforced box culvert quantities are based on Table I fill height conditions with 4:1 side slopes.
- Outlet aprons are required at all box culverts that require extension downstream.
- Existing end sections for pipe culverts are unsalvageable.
- Existing reinforced box culverts and pipe culverts are in good condition and do not require replacement, with the exception of the box culvert east of I-17 through Pinnacle Peak road, the replacement of which is included in the estimate.
- No improvement to washes upstream and downstream of culverts, such as energy dissipators or bank protection, are required.
- Pipes associated with median inlets to be removed, are to be plugged.
- Costs were estimated for the on-site and off-site storm water systems. It is anticipated that drainage costs for the southern section of I-17 would be slightly more expensive than the average freeway section because of the proposed width of the pavement.

ESTIMATE OF PROBABLE COST
I-17 WIDENING STUDY
I-17 - LOOP 101 TO BLACK CANYON CITY TI
PREFERRED ALTERNATIVE

TRACS No.: 17 MA 215 H5162 01L

ITEM	UNIT	QUANTITY	UNIT PRICE	COST
REMOVAL OF STRUCTURES & OBSTRUCTIONS	L. SUM	1	\$750,000	\$750,000
REMOVE BRIDGES	L. SUM	1	\$715,000	\$715,000
REMOVAL OF CONCRETE BARRIER	L. FT.	20,350	\$20	\$407,000
REMOVAL OF CONCRETE CURB AND GUTTER	L. FT.	21,603	\$2.50	\$54,000
REMOVAL OF ASPHALTIC CONCRETE PAVEMENT	SQ. YD.	1,399,580	\$2	\$2,799,200
REMOVE GUARD RAIL	L. FT.	47,160	\$2.50	\$117,900
REMOVAL OF FENCING	L. FT.	69,100	\$1	\$69,100
ROADWAY EXCAVATION	CU. YD.	176,610	\$6	\$1,059,700
BORROW	CU. YD.	183,060	\$5	\$915,300
ROCK EXCAVATION	CU. YD.	627,510	\$20	\$12,550,200
GRADING ROADWAY FOR PAVEMENT	SQ. YD.	2,989,160	\$3	\$8,967,500
AGGREGATE BASE, CLASS 2	CU. YD.	675,400	\$18	\$12,157,200
ASPHALTIC CONCRETE (END PRODUCT) (9")	TONS	1,035,720	\$50	\$51,786,000
PORTLAND CEMENT CONCRETE PAVEMENT (10")	SQ. YD.	38,740	\$24	\$929,800
PORTLAND CEMENT CONCRETE PAVEMENT (14")	SQ. YD.	890,830	\$30	\$26,724,900
ARFC (1/2" OR 1")	TONS	103,910	\$40	\$4,156,400
REMOVE CATCH BASIN	EACH	47	\$300	\$14,100
REMOVE HEADWALL	EACH	62	\$600	\$37,200
REMOVE AND SALVAGE (PIPE CULVERT)	L. FT.	949	\$5	\$4,700
REMOVE AND SALVAGE (EXST CATCH BASINS)	EACH	24	\$100	\$2,400
PIPE, CORRUGATED METAL, SLOTTED, 24"	L. FT.	680	\$65	\$44,200
STORM DRAIN PIPE, 24"	L. FT.	5,814	\$40	\$232,600
STORM DRAIN PIPE, 36"	L. FT.	3,000	\$70	\$210,000
STORM DRAIN PIPE, 48"	L. FT.	4,800	\$75	\$360,000
STORM DRAIN PIPE, 54"	L. FT.	4,000	\$110	\$440,000
PIPE CULVERT, 18"	L. FT.	70	\$40	\$2,800
PIPE CULVERT, 24"	L.FT.	2910	\$50	\$145,500
PIPE CULVERT, 30"	L.FT.	1778	\$65	\$115,600
PIPE CULVERT, 36"	L.FT.	1822	\$80	\$145,800
PIPE CULVERT, 42"	L.FT.	133	\$95	\$12,600
PIPE CULVERT, 48"	L.FT.	233	\$120	\$28,000
PIPE CULVERT, 54"	L.FT.	33	\$160	\$5,300
PIPE CULVERT, 60"	L.FT.	198	\$180	\$35,600
PIPE CULVERT, 72"	L.FT.	30	\$220	\$6,600
PIPE CULVERT, 78"	L.FT.	65	\$250	\$16,300
PIPE CULVERT, 84"	L.FT.	60	\$280	\$16,800
PIPE CULVERT, (29" X 18")	L.FT.	832	\$50	\$41,600
PIPE CULVERT, (30" X 17")	L. FT.	116	\$70	\$8,100
PIPE CULVERT, (37" X 21")	L. FT.	58	\$90	\$5,200
PIPE CULVERT, (65" X 40")	L.FT.	298	\$100	\$29,800
FLARED END SECTION, 36" (DOUBLE)	EACH	6	\$700	\$4,200
FLARED END SECTION, 24" (C-13.20 OR C-13.25) (PIPE CULVERT)	EACH	40	\$300	\$12,000
FLARED END SECTION, 30" (C-13.20 OR C-13.25) (PIPE CULVERT)	EACH	31	\$350	\$10,900
FLARED END SECTION, 36" (C-13.20 OR C-13.25) (PIPE CULVERT)	EACH	44	\$400	\$17,600
FLARED END SECTION, 42" (C-13.20 OR C-13.25) (PIPE CULVERT)	EACH	6	\$450	\$2,700
STRUCTURAL PLATE PIPE, 72"	L.FT.	30	\$400	\$12,000
HEADWALL (48")	EACH	9	\$2,800	\$25,200
HEADWALL (54")	EACH	2	\$3,000	\$6,000
HEADWALL (60")	EACH	8	\$3,800	\$30,400
HEADWALL (72")	EACH	2	\$4,500	\$9,000
HEADWALL (78")	EACH	2	\$4,800	\$9,600
HEADWALL (84")	EACH	2	\$5,400	\$10,800
EXTEND STRUCTURE (6' X 3' BOX CULVERT & HEADWALLS)	EACH	1	\$24,700	\$24,700
EXTEND STRUCTURE (6' X 4' BOX CULVERT & HEADWALLS)	EACH	2	\$15,000	\$30,000
EXTEND STRUCTURE (6' X 5' BOX CULVERT & HEADWALLS)	EACH	1	\$18,000	\$18,000
EXTEND STRUCTURE (6' X 6' BOX CULVERT & HEADWALLS)	EACH	1	\$20,000	\$20,000
EXTEND STRUCTURE (6' X 7' BOX CULVERT & HEADWALLS)	EACH	5	\$33,000	\$165,000
EXTEND STRUCTURE (8' X 7' BOX CULVERT & HEADWALLS)	EACH	2	\$18,000	\$36,000
EXTEND STRUCTURE (2 - 8' X 6' BOX CULVERT & HEADWALLS)	EACH	1	\$46,000	\$46,000
EXTEND STRUCTURE (2 - 8' X 7' BOX CULVERT & HEADWALLS)	EACH	2	\$58,300	\$116,600
EXTEND STRUCTURE (3 - 8' X 7' BOX CULVERT & HEADWALLS)	EACH	1	\$44,000	\$44,000

ITEM	UNIT	QUANTITY	UNIT PRICE	COST
EXTEND STRUCTURE (10' X 3' BOX CULVERT & HEADWALLS)	EACH	1	\$21,000	\$21,000
EXTEND STRUCTURE (10' X 4' BOX CULVERT & HEADWALLS)	EACH	1	\$26,000	\$26,000
EXTEND STRUCTURE (10' X 8' BOX CULVERT & HEADWALLS)	EACH	2	\$20,000	\$40,000
EXTEND STRUCTURE (10' X 10' BOX CULVERT & HEADWALLS)	EACH	3	\$37,000	\$111,000
EXTEND STRUCTURE (2 - 10' X 5' BOX CULVERT & HEADWALLS)	EACH	1	\$231,800	\$231,800
EXTEND STRUCTURE (2 - 10' X 7' BOX CULVERT & HEADWALLS)	EACH	1	\$42,000	\$42,000
EXTEND STRUCTURE (2 - 10' X 8' BOX CULVERT & HEADWALLS)	EACH	6	\$44,000	\$264,000
EXTEND STRUCTURE (3 - 10' X 10' BOX CULVERT & HEADWALLS)	EACH	1	\$46,000	\$46,000
NEW STRUCTURE (10' X 7' BOX CULVERT & HEADWALLS) (FOR DET BASIN)	EACH	2	\$138,800	\$277,600
NEW STRUCTURE (2 - 8' X 7' BOX CULVERT & HEADWALLS) (PINNACLE PEAK)	EACH	1	\$247,300	\$247,300
CONCRETE CATCH BASIN (C-15.91) (H=8' OR LESS)	EACH	68	\$1,700	\$115,600
CONCRETE CATCH BASIN (MEDIAN) (C-15.80), H=8' OR LESS	EACH	10	\$1,700	\$17,000
MANHOLE (C-18.10) (NO. 3)(FOR PIPES 6" TO 36")	EACH	20	\$2,500	\$50,000
MANHOLE (C-18.10) (NO. 3)(FOR PIPES OVER 36") H= 15' OR LESS	EACH	8	\$3,000	\$24,000
MISC DRAINAGE COSTS (SCATTER WASH RETENTION BASIN)	L. SUM	1	\$256,000	\$256,000
CHANNEL EXCAVATION	CU. YD.	483,040	\$3	\$1,449,100
DRAINAGE EXCAVATION (SCATTER WASH RETENTION BASIN)	CU. YD.	62,920	\$3	\$188,800
CONCRETE LINED DITCH (3")	SQ. YD.	52,260	\$18	\$940,700
BRIDGE (NEW)	SQ. FT.	88,680	\$80	\$7,094,400
BRIDGE (MODIFICATIONS TO EXISTING)	SQ. FT.	189,122	\$90	\$17,020,900
INTERCHANGE RECONSTRUCTION	EACH	3	\$6,000,000	\$18,000,000
CANTILEVER SIGN STRUCTURE & FOUNDATION	EACH	18	\$26,000	\$468,000
SIGN STRUCTURE & FOUNDATION	EACH	3	\$92,000	\$276,000
SIGN STRUCTURE (VMS) & FOUNDATION	EACH	1	\$150,000	\$150,000
LIGHTING	MILE	30.00	\$300,000	\$9,000,000
SIGNING AND PAVEMENT MARKING	MILE	30.50	\$150,000	\$4,575,000
RECONSTRUCT RAMP GORE AREA (PHASED)	EACH	98	\$75,000	\$7,350,000
TRAFFIC CONTROL SYSTEM (FMS)	MILE	18.3	\$250,000	\$4,575,000
LANDSCAPING & IRRIGATION	MILE	18.3	\$600,000	\$10,980,000
UTILITIES RELOCATION	MILE	16	\$250,000	\$4,000,000
FENCING	L. FT.	85,400	\$7	\$597,800
GUARD RAIL	L. FT.	38,490	\$15	\$558,100
GUARD RAIL EXTRUDER TERMINAL	EACH	118	\$4,000	\$472,000
IMPACT ATTENUATION DEVICE	EACH	17	\$23,000	\$391,000
CONCRETE CURB AND GUTTER	L. FT.	11,100	\$9	\$99,900
CONCRETE MEDIAN BARRIER	L. FT.	86,285	\$50	\$4,314,300
CONCRETE BARRIER	L. FT.	43,750	\$40	\$1,750,000
MEDIAN BARRIER WALL	L. FT.	7,580	\$75	\$568,500
RETAINING WALL	SQ. FT.	8,750	\$35	\$306,300
NOISE WALL	SQ. FT.	188,530	\$18	\$3,393,500
SUBTOTAL 1				\$227,059,300
MISCELLANEOUS WORK		15%		\$34,058,900
SUBTOTAL 2				\$261,118,200
CONSTRUCTION SURVEYING		2%		\$5,222,400
EROSION CONTROL		1%		\$2,611,200
QUALITY CONTROL		2%		\$5,222,400
DUST AND WATER PALLIATIVE		2%		\$5,222,400
MAINTENANCE AND PROTECTION OF TRAFFIC		10%		\$26,111,800
SUBTOTAL 3				\$305,508,400
MOBILIZATION		10%		\$30,550,800
SUBTOTAL CONSTRUCTION COST				\$336,059,200
CONSTRUCTION ENGINEERING		15%		\$50,408,900
TOTAL CONSTRUCTION COST				\$386,468,100
RIGHT-OF-WAY REQUIREMENTS	L. SUM	1	\$31,732,200	\$31,732,200
DESIGN ENGINEERING		8%		\$30,917,400
TABLE MESA RECONSTRUCTION (RECOMMENDED ALTERNATIVE)	L. SUM	1	\$7,978,100	\$7,978,100
TOTAL PROJECT COST				\$457,095,800